

Claims

1. Method for preparing a wet strength agent comprising a first step of reacting a nitrogen-containing polymer with a hydrophobic compound to form hydrophobic side-chain substituents on the polymer, a second step of reacting the hydrophobised nitrogen-containing polymer obtained with a crosslinker to form a cationic nitrogen-containing resin, and a third step comprising forming of particles by emulsion polymerisation of one or more ethylenically unsaturated monomers in the presence of the wet strength resin formed.

2. Method according to claim 1 w h e r e i n the nitrogen-containing polymer is a polyamine or a polyaminoamide.

3. Method according to any of the claims 1-2 wherein the first step is a vinyllog addition or alkylation where the hydrophobic compound is selected from alkyl(meth)acrylates, alkyl(meth)acrylamides, alkyl sulphonates, alkyl sulphates, diazo compounds, ethers, or epoxides or mixtures thereof.

4. Method according to claim 1 w h e r e i n the hydrophobic compounds comprise a hydrophobic chain having 6-40 carbon atoms.

5. Method according to claim 1 w h e r e i n the hydrophobic compounds comprise a hydrophobic chain having 8-40 carbon atoms.

6. Method according to claim 1 w h e r e i n the hydrophobic compound contains a chain of atoms containing at least one hetero atom.

7. Method according to claim 1 w h e r e i n the crosslinker is epichlorohydrin.

8. Method according to claim 1 w h e r e i n the monomers are selected from styrene, butadiene, alkyl (meth)acrylates, alkyl(meth)amides, (meth)acrylonitrile, vinyl acetate, or vinyl amide, or mixtures or derivatives thereof.

9. Method as claimed in claim 1 w h e r e i n the hydrophobic compound is a saturated compound, or an unsaturated compound, resulting in a nitrogen-containing polymer having saturated side-chain substituents.

10. Paper wet strength agent obtainable by a method as defined in claim 9.

11. Paper wet strength agent comprising a wet strength resin comprising cationic nitrogen-containing polymers having hydrophobic saturated side-chain substituents and groups derived from a crosslinker; and polymeric particles.

12. Paper wet strength agent according to claim 11 w h e r e i n the hydrophobic side-chain substituents contain a hydrophobic group attached to a nitrogen atom of the nitrogen-containing polymer via a chain of atoms comprising 6-40 carbon atoms.

5 13. Paper wet strength agent according to any of claims 11-12 w h e r e i n the hydrophobic side-chain substituents are selected from derivatives of alkyl(meth)acrylates, alkyl(meth)acrylamides, alkyl sulphonates, alkyl sulphates, diazo compounds, ethers, or epoxides or mixtures thereof.

10 14. Method for preparing a wet strength resin comprising a first step of reacting a nitrogen-containing polymer with a hydrophobic compound to form hydrophobic side-chain substituents, in which said hydrophobic compound is selected from alkyl(meth)acrylates, alkyl(meth)acrylamides, alkyl sulphonates, alkyl sulphates, diazo compounds, ethers, or epoxides or mixtures thereof, and a second step of reacting the hydrophobised nitrogen-containing polymer obtained with a crosslinker to form a cationic nitrogen-containing resin.

15 15. Method according to claim 14 w h e r e i n the hydrophobic compound contains 6-40 carbon atoms.

16. Method as claimed in claims 14 or 15 w h e r e i n the hydrophobic compound is a saturated compound, or an unsaturated compound, resulting in a nitrogen-containing polymer having saturated side-chain substituents.

17. Paper wet strength resin obtainable by a method as defined in claims 14-15.

20 18. Paper wet strength resin comprising cationic nitrogen-containing polymers having saturated hydrophobic side-chain substituents selected from compounds derived from alkyl(meth)acrylates, alkyl(meth)acrylamides, alkyl sulphonates, alkyl sulphates, diazo compounds, ethers, or epoxides or mixtures thereof; and groups derived from a crosslinker.

25 19. Process for production of tissue paper comprising addition of a paper wet strength resin or agent, comprising a cationic nitrogen-containing polymer having hydrophobic side-chain substituents, to an aqueous cellulosic suspension.

20. Process according to claim 19, wherein the paper wet strength resin or agent is added in an amount of from about 5 to about 50 kg/tonne dry cellulosic fibres.

30 21. Process according to claims 19 or 20, wherein the paper wet strength resin is added in an amount of from about 15 to about 50 kg/tonne dry cellulosic fibres.

22. Process according to claim 20, wherein the paper wet strength resin is added in an amount of from about 25 to about 50 kg/tonne dry cellulosic fibres.

23. Process according to claim 20, wherein a dry strength agent is added in combination with the paper wet strength resin or agent.

5        24. Process according to claim 20, wherein the produced tissue paper has a grammage lower than about 70 g/m<sup>2</sup>.

25. Tissue paper comprising a paper wet strength resin or agent comprising a cationic nitrogen-containing polymer having hydrophobic side-chain substituents.

10       26. Tissue paper according to claim 25, wherein the tissue paper comprises a paper wet strength resin or agent in an amount from about 5 to about 50 kg/tonne dry cellulosic fibres.

27. Tissue paper comprising a paper wet strength resin or agent obtainable by a method according to any of claims 19-24.